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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte YUNG-HO CHUANG, J. JOSEPH ARMSTRONG,
and DAVID R. SHAFER

Appeal 2009-002350
Application 10/615,512
Technology Center 2800

Decided:¹ July 30, 2009

Before KENNETH W. HAIRSTON, JOSEPH F. RUGGIERO,
and MAHSHID D. SAADAT, *Administrative Patent Judges*.

HAIRSTON, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants appeal under 35 U.S.C. § 134 from a final rejection of claims 1, 2, 5-9, 70, and 75 to 91. We have jurisdiction under 35 U.S.C. § 6(b).

¹ The two-month time period for filing an appeal or commencing a civil action, as recited in 37 C.F.R. § 1.304, begins to run from the decided date shown on this page of the decision. The time period does not run from the Mail Date (paper delivery) or Notification Date (electronic delivery).

We will reverse the rejections.

Appellants have invented a method and system for inspecting a specimen using optical imaging (Fig. 17; Abstract; Spec. 2). The apparatus includes a catadioptric group of lenses, each of a size less than 100 millimeters in diameter, and is able to examine a specimen at a specific wavelength, field of view, and numerical aperture (Abstract; Spec. 52-57; claims 1, 75, 83, 86).

Claim 1 is representative of the claimed invention, and reads as follows:

1. A system for inspecting a specimen, comprising:

an illumination system comprising an arc lamp able to provide light energy having a wavelength in the range of less than approximately 320 nanometers; and

an imaging subsystem oriented and configured to receive said light energy from said illumination system and direct light energy toward said specimen, said imaging subsystem comprising a plurality of elements all aligned along a single axis, each element having diameter less than approximately 100 millimeters, wherein the imaging subsystem is configured to provide a field size in excess of approximately 0.4 millimeters at a numerical aperture of approximately 0.90 for the light energy received from the illumination system having the wavelength in the range of less than approximately 320 nanometers.

The prior art relied upon by the Examiner in rejecting the claims on appeal is:

Shafer '518	US 5,717,518	Feb. 10, 1998
Chuang	US 6,064,517	May 16, 2000
Shafer '722	US 2001/0040722 A1	Nov. 15, 2001
Liang	US 2004/0051957 A1	Mar. 18, 2004

The Examiner rejected claims 75, 79 to 81, 83, 86, and 90 under 35 U.S.C. § 102(b) based upon the teachings of Chuang.

The Examiner rejected claims 76 and 87 under 35 U.S.C. § 103(a) based upon the teachings of Chuang.

The Examiner rejected claims 1, 6 to 9, 82, 85, and 91 under 35 U.S.C. § 103(a) based upon the teachings of Chuang and Shafer '518.

The Examiner rejected claims 1, 2, 5, 70, 75 to 78, 83, 84, and 86 to 89 under 35 U.S.C. § 103(a) based upon the teachings of Liang and Shafer '722.

ISSUES

Anticipation

Appellants argue (App. Br. 10-11; Reply Br. 2-4) that (i) the claimed imaging subsystem is broader than simply the focusing lens group 1702 of Chuang upon which the Examiner relies, (ii) Chuang fails to teach a method and apparatus having optical elements which are each less than 100 millimeters in diameter as recited in claims 75, 83, and 86, (iii) the entirety of Figure 17 of Chuang includes catadioptric element 1706 in catadioptric group 1701 which is over 100 millimeters in diameter, and (iv) Chuang's focusing group 1702 cannot provide a field size in excess of approximately 0.4 millimeters at a numerical aperture of approximately 0.9 because catadioptric group 1701 is needed to achieve these limitations (and is over 100 millimeters in diameter). Thus, the issue before us is: Have Appellants demonstrated that the Examiner erred by finding that Chuang teaches or suggests the claimed method and system for inspecting a specimen including an imaging subsystem and optical elements each having a maximum

diameter less than approximately 100 millimeters and configured to provide a field size in excess of approximately 0.4 millimeters at a numerical aperture of approximately 0.90?

Obviousness

Appellants argue (App. Br. 16-20; Reply Br. 5-11) that Liang fails to teach a field of view in excess of approximately 0.4 millimeters, and instead only supports a field of view of 0.24 millimeters which is 66% less, since the wording of Liang suggests a field of view of 'substantially 220-240 μm or more' (Reply Br. 7). Thus, the first obviousness issue before us is: Have Appellants demonstrated that the Examiner erred by finding that Liang teaches or suggests a field size in excess of approximately 0.4?

Appellants also argue (App. Br. 10-22; Reply Br. 5-11) that the applied references to Chuang, Liang, Shafer '518, and Shafer '722 fail to teach the claimed subject matter set forth in claims 1, 2, 5 to 9, 70, 75 to 78, 82 to 89, and 91. Thus, the second obviousness issue before us is: Have Appellants shown that the applied references neither teach nor would have suggested the claimed subject matter of claims 1, 2, 5 to 9, 70, 75 to 78, 82 to 89, and 91?

FINDINGS OF FACT

1. As indicated *supra*, Appellants describe a method and system for inspecting a specimen using optical imaging (Fig. 17; Abstract; Spec. 2), including a catadioptric group of lenses, each of a size less than 100 millimeters in diameter which is able to examine a specimen at a field size in excess of approximately 0.4 millimeters at a numerical aperture of approximately 0.90 (Abstract; Spec. 52-57; claims 1, 75, 83, 86).

2. Chuang describes a method and system for inspecting a specimen using optical imaging (Figs. 7, 17; Abstract; col. 11, ll. 35-44; col. 19, ll. 43-55; col. 20, ll. 6-45 including Table), including a focusing group 1702 of lenses having diameters less than 100 millimeters, and a catadioptric group of lenses 1701 having some diameters larger than 100 millimeters in diameter (*see* col. 20, ll. 38-43 listing radii of elements 1705 and 1706 in excess of 50 millimeters which is more than a diameter of 100 millimeters based on a diameter being twice a radius).

3. Chuang describes that the catadioptric group 1701 is able to examine a specimen at a field size in excess of approximately 0.4 millimeters at a numerical aperture of approximately 0.90 (col. 19, ll. 43-55).

4. Liang describes a method and system for inspecting a specimen using optical imaging including an imaging subsystem configured to provide a field of view (i.e., field size) that is “substantially 220-240 μm or more” (§ [0010]; *see* claims 3, 13, 16). Liang also describes the field of view as being “around 220 μm to 240 μm ” (§ [0055]).

PRINCIPLES OF LAW

Anticipation

Anticipation is established when a single prior art reference discloses expressly or under the principles of inherency each and every limitation of the claimed invention. *Atlas Powder Co. v. IRECO, Inc.*, 190 F.3d 1342, 1347 (Fed. Cir. 1999); *In re Paulsen*, 30 F.3d 1475, 1478-79 (Fed. Cir. 1994).

Obviousness

The Examiner bears the initial burden of presenting a prima facie case of obviousness, and Appellants have the burden of presenting a rebuttal to the prima facie case. *In re Oetiker*, 977 F.2d 1443, 1445 (Fed. Cir. 1992).

In rejecting claims under 35 U.S.C. § 103, it is incumbent upon the Examiner to establish a factual basis to support the legal conclusion of obviousness. *See In re Fine*, 837 F.2d 1071, 1073 (Fed. Cir. 1988).

The Examiner's articulated reasoning in the rejection must possess a rational underpinning to support the legal conclusion of obviousness. *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006).

ANALYSIS

Anticipation

Appellants argue that taking the entirety of FIG. 17 of Chuang into account, the imaging subsystem in Chuang should be interpreted to include catadioptric element (or dome shaped reflector) 1706, which is over 100 millimeters in diameter. Thus Appellants contend that Chuang does not anticipate claim 75 ("said imaging subsystem comprising a plurality of optical elements all aligned along an axis and each having maximum diameter less than approximately 100 millimeters"), claim 83 ("an imaging subsystem configured to receive said light energy and direct light energy toward said specimen using a plurality of elements having a maximum diameter less than approximately 100 millimeters"), or claim 86 ("directing light energy toward said specimen using a plurality of optical elements aligned collectively along a single axis, each optical element having maximum diameter less than approximately 100 millimeters") or claims

dependent therefrom, nor does Chuang render dependent claims 76 and 87 obvious as they include limitations not present in Chuang.

We agree with Appellants (App. Br. 10-11; Reply Br. 2-3) that Chuang's focusing group 1702 cannot provide a field size in excess of approximately 0.4 millimeters at a numerical aperture of approximately 0.9 because catadioptric group 1701 is needed to achieve these limitations (and is over 100 millimeters in diameter) and (Reply Br. 2-4) that Chuang fails to teach an imaging subsystem and optical elements each having a maximum diameter less than approximately 100 millimeters and configured to provide a field size in excess of approximately 0.4 millimeters at a numerical aperture of approximately 0.90. Chuang is silent as to the field of view provided by the focusing group 1702. Chang discloses merely that the catadioptric group 1701, which contains elements larger than 100 millimeters (FF 3), can provide the noted field of view and numerical aperture (FF 2). In Chuang, it is the catadioptric group 1701, including elements 1705 and 1706 which have diameters larger than 100 millimeters (FF 2), that provides the field size in excess of approximately 0.4 millimeters at a numerical aperture of approximately 0.90 (FF 3).

Thus, we agree with Appellants' arguments (App. Br. 6-10; Reply Br. 2-4) that Chuang fails to disclose the noted method step and system limitations. It follows that anticipation has not been established by the Examiner because Chuang does not disclose each and every limitation of the claimed invention set forth in claims 75, 79 to 81, 83, 86, and 90. *Atlas Powder Co.*, 190 F.3d at 1347; *Paulsen*, 30 F.3d at 1478-79. Accordingly, we will not sustain the Examiner's anticipation rejection.

Obviousness

Turning next to the first obviousness issue, we agree with Appellants' arguments (App. Br. 16-20; Reply Br. 5-9) that Liang fails to teach or suggest a specimen inspecting system and method having a field size in excess of approximately 0.4 millimeters. Liang merely describes a field of view (i.e., field size) that is "substantially 220-240 μm or more" (FF 4). We agree with Appellants (App. Br. 16-20; Reply Br. 5-9) that Liang's disclosure, taken in its entirety by one of ordinary skill in the art, would not support a field of view in excess of approximately 0.4 millimeters or 400 micrometers.

Turning finally to the second obviousness issue, a *prima facie* case of obviousness of the claimed subject matter set forth in (i) dependent claims 76 and 87 has not been established by the Examiner because Chuang does not teach or suggest a specimen inspecting method and system including an imaging subsystem and optical elements each having a maximum diameter less than approximately 100 millimeters and configured to provide a field size in excess of approximately 0.4 millimeters at a numerical aperture of approximately 0.90;² (ii) claims 1, 6 to 9, 82, 85, and 91 has not been established by the Examiner because of the noted shortcomings in the teachings of Chuang, and because Shafer '581 fails to cure the noted shortcomings in the teachings of Chuang; and (iii) claims 1, 2, 5, 70, 75 to 78, 83, 84, and 86 to 89 has not been established by the Examiner because Liang does not teach or suggest a specimen inspecting system and method having a field size in excess of approximately 0.4 millimeters, and because

² See discussion *supra* with respect to the anticipation rejection of claims 75 and 86 from which claims 76 and 87 depend, respectively.

the teachings of the reference to Shafter '722 fail to cure the noted shortcomings in the teachings of Liang. *Oetiker*, 977 F.2d at 1445.

Accordingly, we will not sustain the Examiner's obviousness rejections.

Summary

The anticipation rejection of claims 75, 79 to 81, 83, 86, and 90 is not sustained because Chuang does not teach an imaging subsystem and optical elements each having a maximum diameter less than approximately 100 millimeters and configured to provide a field size in excess of approximately 0.4 millimeters at a numerical aperture of approximately 0.90. The obviousness rejection of claims 1, 2, 5 to 9, 70, 75 to 78, 82 to 89, and 91 is not sustained because the Examiner's factual bases and articulated reasoning concerning the teachings of Chuang, Liang, Shafer '518, and Shafer '722 do not support a legal conclusion of obviousness. *See Fine*, 837 F.2d at 1073; *Kahn*, 441 F.3d at 988.

CONCLUSIONS OF LAW

Anticipation

Appellants have demonstrated that the Examiner erred by finding that Chuang teaches the claimed method and system for inspecting a specimen including an imaging subsystem and optical elements each having a maximum diameter less than approximately 100 millimeters and configured to provide a field size in excess of approximately 0.4 millimeters at a numerical aperture of approximately 0.90.

Thus, Appellants have shown that the Examiner erred in rejecting each of claims 75, 79 to 81, 83, 86, and 90 under § 102(b).

Obviousness

Appellants have demonstrated that the Examiner erred by finding that Liang teaches or suggests a field size in excess of approximately 0.4.

Appellants have demonstrated that the Examiner erred by (i) finding that the applied references teach or would have suggested the claimed subject matter of claims 1, 2, 5 to 9, 70, 75 to 78, 82 to 89, and 91, and therefore (ii) rejecting these claims under § 103(a).

ORDER

The anticipation rejection of claims 75, 79 to 81, 83, 86, and 90 is reversed, and the obviousness rejections of claims 1, 2, 5 to 9, 70, 75 to 78, 82 to 89, and 91 are reversed.

REVERSED

KIS

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